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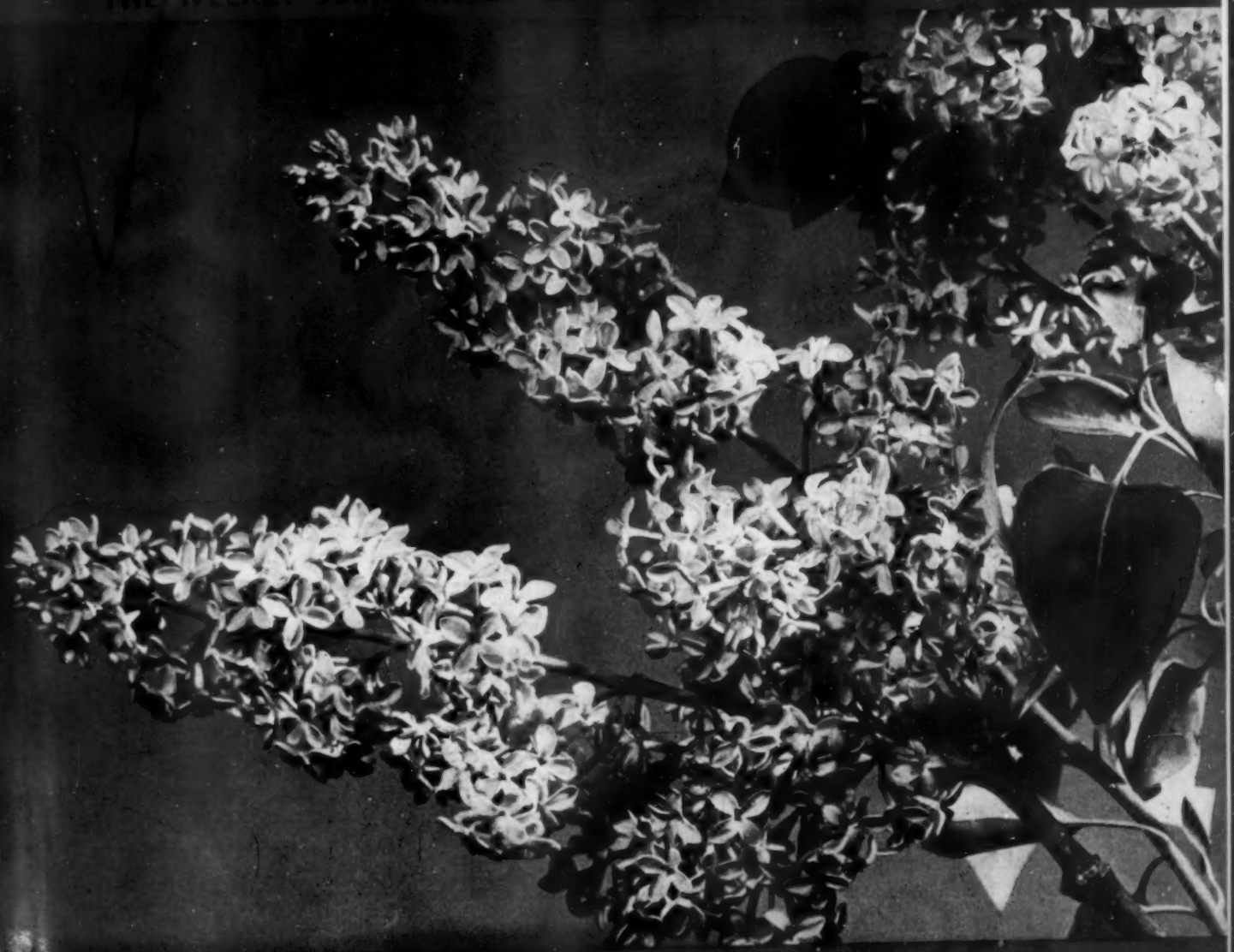
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

MAY 11, 1946



Synthetic Scent

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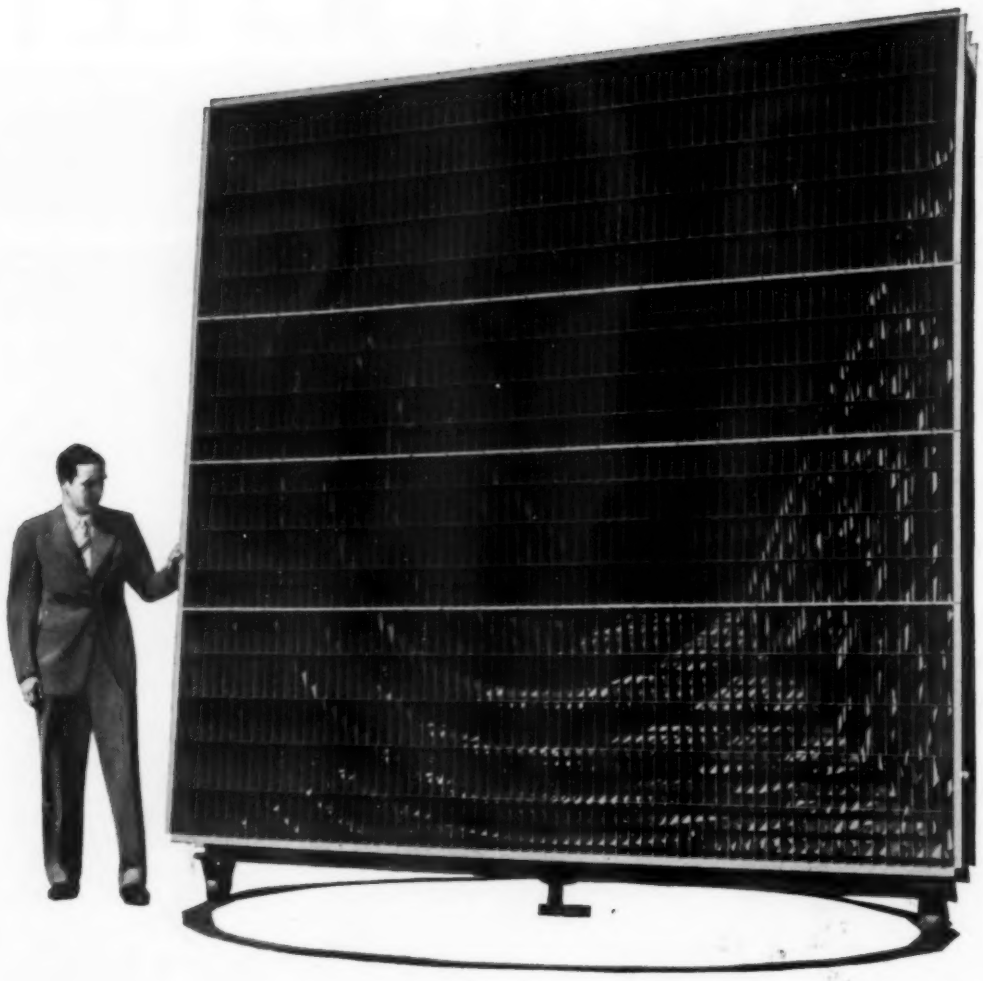
A SCIENCE SERVICE PUBLICATION

1921 TWENTY-FIFTH ANNIVERSARY 1946



• A "SEARCHLIGHT" TO FOCUS RADIO WAVES

In the new microwave radio relay system between New York and Boston, which Bell Laboratories are developing for the Bell System, giant lenses will shape and aim the wave energy as a searchlight aims a light beam.

This unique lens – an array of metal plates – receives divergent waves through a waveguide in the rear. As they pass between the metal plates their direction of motion is bent inward so that the energy travels out as a nearly parallel beam. At the next relay point a similar combination of lens and waveguide, working in reverse, funnels the energy back into a repeater for amplification and retransmission.

A product of fundamental research on waveguides, metallic lenses were first developed by the Laboratories during the war to produce precise radio beams.

But how to focus waves is only one of many problems that Bell Telephone Laboratories are working on to speed microwave transmission. The goal of this and all Bell Laboratories research for the Bell System is the same – to keep on making American telephone service better and better.

BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

PHYSICS

New-Type Atom Smasher

The 300 million electron volt synchrotron will eventually enable scientists to fire atomic bullets of one billion electron volts.

➤ A 300 MILLION electron volt synchrotron, the powerful new-type atom-smashing machine based on a revolutionary principle which eventually will enable scientists to fire atomic bullets of one billion electron volts, will be completed at the University of California early next year, Prof. Ernest O. Lawrence, director of the Radiation Laboratory, announced. It is being constructed with the assistance of the Manhattan District.

The synchrotron, combining features of the cyclotron and the betatron with the new principle, will accelerate electrons as projectiles. It is hoped, with the almost incredible new energies, that it will be possible not simply to "smash" the atomic nucleus, but to split the particles —protons and neutrons—which are the basic building blocks of the nucleus.

Since the projectiles themselves will be in the energy ranges of cosmic rays, it will be possible to create these fundamental radiations for close study in the laboratory. Thus scientists will cross into a new unknown of atomic research, a seven-league stride closer to understanding the elemental forces of the universe.

Devised independently by Prof. Edwin M. McMillan, co-discoverer of neptunium, and the Russian scientist, V. Veksler, the synchrotron principle was said by Prof. Lawrence to be as important a development in atom-smashing as was the cyclotron. In a recent letter in *Physical Review,* Veksler said he is supervising construction of a 30 million electron volt synchrotron in Moscow.

This principle is what Prof. McMillan calls the theory of phase stability. It bypasses part of the theory of relativity which imposes limitations on the energies which can be reached in the acceleration of particles. Relativity predicts that as particles reach higher energies their mass increases and they tend to slow down. In the cyclotron this meant that atomic bullets, when they reached very high energies, would fall out of step with the regularly-spaced high-frequency electrical pushes applied to speed them up. Arriving too late at the accelerating point, they would be out of phase and receive no push.

Like a mechanical drill sergeant, the synchrotron will be able to march electrons around a circular orbit an indefinite number of times, keeping the projectiles in perfect step with the high-frequency pushes. This will be done by increasing the magnetic field of the machine's electromagnet as the particles reach higher energies. Thus the increased magnetic force will jerk lagging projectiles up to the acceleration point exactly in time to receive a new push.

Theoretically, there is no limit to the number of times the synchrotron can "call the turn." Practically, the energies achieved will be limited by the strength of the field which can be created by the electromagnet. When the speeding particles reach a certain energy the magnet can no longer exert the necessary force to jerk them up to the acceleration point, and the relativity limitation becomes effective.

In the University of California synchrotron this point will be reached at 300 million electron volts. Prof. McMillan said that he believes present knowledge of electromagnets will permit construction of one which could be used to accelerate electrons to a billion electron volts.

The synchrotron will be doughnut-shaped, hollow in the center. The laminated transformer-steel electromagnet will weigh 135 tons, and its maximum field strength will be 10,000 gauss. The orbit of the acceleration tank between the poles will be one meter. The tank will have one C-shaped accelerating "dee".

The machine will operate up to two million electron volts as a betatron, the sheer force of the magnetic field driving the particles around the tire-shaped tank. At 300 million electron volts the electrons will have circled the tank 200,000 times before emerging as a beam, and the particles will weigh 600 times as much as they do at rest.

By comparison, Prof. Lawrence's new cyclotron has a magnet weighing 400 tons, and an accelerating tank 184 inches in diameter.

Prof. McMillan's theory of phase stability will be applied to this huge machine to achieve higher energies with

COUNTS BIKINI FISH—To get an accurate and scientific survey of fish in the Bikini Lagoon, Vernon E. Brock, director of Fish and Game for the Territory of Hawaii (right) and Ensign Richard Cron, Houston, Texas, use an undersea camera. Some species never before classified have been found at Bikini. Joint Army-Navy Task Force One photograph.

heavy particles—protons, deuterons and alpha particles. The application will differ from that in the synchrotron. Instead of altering the magnetic field to keep the particles in step, the frequency of the accelerating electrical impulses will be changed, coming at slightly longer intervals in order to hit the lagging projectiles as they arrive at the acceleration point. This is called frequency modulation. Prof. Lawrence has estimated that the giant cyclotron, which was started prior to the war and designed to accelerate deuterons to 100 million electron volts, will be able to produce deuterons of double this energy as a result of Prof. McMillan's theory.

The Russian, Veksler, published his theories in Russia before Prof. McMillan's first article on the subject was printed in the *Physical Review* last September. However, with communications what they were under wartime conditions, Veksler's articles were not known to Prof. McMillan until two months after he sent his letter to the *Physical Review*. Prof. McMillan was working at the University of California atomic bomb factory at Los Alamos, N. Mex., when he formulated this theory of phase stability. Prof. Lawrence stated that the Manhattan District has given every encouragement to the development of the synchrotron with the purpose of maintaining the pre-eminence of American fundamental science.

Science News Letter, May 11, 1946

ENGINEERING

Rocket Devices Patented

Nine patents have recently been granted to the late Prof. Robert H. Goddard. A hydro-pneumatically controlled automatic steering apparatus for aircraft is included.

➤ ROCKET DEVICES invented by the late Prof. Robert H. Goddard of Clark University and Roswell, N. Mex., are beginning to be made public through the issuance of U. S. patents. Nine such patents, for which applications were filed during or before the war, have been granted during the past few weeks.

One of them is a design for what might be called a rocket landing-strip to receive, if not space-ships from Mars and Jupiter, at least the ultra-high-speed stratosphere craft which rocket propulsion may make possible. Essentially, this device is really a big tube closed at one end, and with a trumpet-like flare at its open end. The rocket-craft is expected to enter this like a ferry going into its slip; wheels at various points on its circumference help to guide it smoothly. As it passes into the narrower part of the tube it will practically fill it, and will thus act as the piston in a grand-scale pneumatic shock absorber. As its nose reaches the closed end it will contact a final checking device built on the principle of the recoil cylinder under an artillery piece.

Several of the patents cover variations in the Goddard fuel system, which is based on the use of the combustion of gasoline or other hydrocarbon fuel with liquid oxygen. A tank of liquid nitrogen is also carried, to fill the empty space created in the gasoline tank as the latter is used up.

Prof. Goddard was especially concerned with keeping the temperature of the combustion chamber within manageable limits. In several of his designs, this is done by wrapping around it a helical coil from the liquid nitrogen tank. The liquid nitrogen thus heated passed as a gas under pressure to the gasoline tank. Some of the combustion chambers revolve as the fuel burns; ribs or baffle-plates within them mix the fuel and oxygen more thoroughly. Another design calls for a triple-walled combustion chamber.

Included among the nine patents are an exploratory research rocket, to be propelled by a series of explosive charges, automatically fed from a tubular magazine and set off in series; also a hydro-pneumatically controlled automatic steering apparatus for aircraft.

The patents are numbered, inclusively, 2,395,113—2,395,114, 2,395,403—2,395,406 and 2,396,566—2,396,568. Half-rights in all patents are assigned to the Guggenheim Foundation.

Science News Letter, May 11, 1946

MEDICINE

$5,000 Awarded for Virus Research Technic

➤ DR. ERNEST W. GOODPASTURE, professor of pathology and dean of the School of Medicine of Vanderbilt University, Nashville, Tenn., will receive the $5,000 Passano Foundation Award on May 15 for his discovery of a method of growing disease viruses on chick embryos.

The vaccine which has protected American troops against typhus fever, and improved defenses against influenza, smallpox, yellow fever, fowlpox and rinderpest through vaccines are among the results of Dr. Goodpasture's discovery.

The Passano Foundation was established in 1944, by the Williams and Wilkins Company, medical publishers, "to aid in any possible way the advancement of medical research," especially research promising clinical application.

Science News Letter, May 11, 1946

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MEDICINE

Who Gets Streptomycin

Typhoid, rabbit fever, a special kind of heart disease and undulant fever are among the nine diseases which will be treated with the drug.

➤ PATIENTS with typhoid fever, a special kind of heart disease, and tularemia or rabbit fever, are among those who may get streptomycin from the present very limited supplies of this antibiotic drug.

Acute brucellosis, also called undulant fever or Malta fever, with bloodstream infection, is another of the nine diseases which a National Research Council committee includes on the list for which it will allocate supplies of streptomycin for clinical investigation.

The special heart disease is bacterial endocarditis due to infection with gram negative bacilli. Penicillin is not very active against gram negative bacilli or bacteria, which is one reason for trials of streptomycin in such infections.

Gram negative infections of the kidneys and bladder resistant to sulfa drugs, and other infections with such germs causing blood poisoning, will be investigated with streptomycin treatment.

Paratyphoid fever, a relatively rare kind of pneumonia due to Friedlander's bacillus and pneumonia, meningitis, middle ear disease and laryngo-tracheitis when due to a germ called *Hemophilus influenzae,* complete the list of diseases to be studied. This last germ, in spite of its name, is not the virus causing influenza.

Leukemia, cancer, fever of unknown cause, rheumatic fever, rheumatoid arthritis, chronic idiopathic ulcerative colitis and lupus erythematosis acutus disseminatus, which is a chronic skin disease, will not be studied at present, Dr. Chester S. Keefer, chairman of the committee, reports. (Journal of the *American Medical Association,* May 4).

Only those patients with tuberculosis who were getting streptomycin before March 1, 1946, will be included in the study, although the committee hopes to extend the study of streptomycin in tuberculosis when a larger supply of the drug is available.

Patients with the diseases and infections on the list for study will get streptomycin only if they are under the care of certain accredited hospital physicians or if their own physicians comply with regulations for furnishing full information about the case to the committee.

No patient who does get streptomycin may pay for it, nor will any physician be charged for it. Grants in aid from 11 pharmaceutical and chemical companies are supporting the study of the committee and will pay for the drug.

Science News Letter, May 11, 1946

NUTRITION

Calorie-Cutting Effects

Depend on time, body fat, size of cut. No sharp line between how many calories a day are required and how many are extra or desirable for best health.

➤ AMERICANS going on a calorie-cutting diet to save food for hungry Europeans will feel the effects according to: 1. how drastic the calorie-cut is; 2. how long it is continued; 3. how much reserve of fat and protein is stored in their bodies.

No sharp line can be drawn between how many calories a day are absolutely required and how many are extra or desirable for the best health. A person can get along on practically no food at all for a week or so. Shipwrecked men have gone for weeks with no food at all and survived, though they may have been almost dead when rescued.

A daily ration of 1500 calories is considered about the least on which life can be maintained with any sort of health over any length of time. Yet many overweight persons have lived for weeks and months on reducing diets, prescribed by physicians, which furnished far fewer than 1500 calories per day. These people were able to eat less calories because they were living partly on the calories from fat stored in their bodies.

Scientists, in recent years particularly, have been more concerned with finding the best diets for good health than with learning how little food people can live on. During the war, however, Dr. Ancel Keys and associates at the University of Minnesota studied the effects of starvation on 34 normal young men.

These previously normal men lived for six months on a European type of famine diet. Instead of the 3200 calories daily they required for good health they existed on 1790 calories a day. Their daily diet had less than one ounce of fat and less than two ounces of proteins from meat or fish, or eggs or cheese or milk.

They felt cold and hungry and depressed. They lost one-fourth of their body weight. Their muscles became so weak after 24 weeks on the diet that they could only run 52 minutes on a motor-driven treadmill, although before going on the diet they could run for over four hours before becoming exhausted.

Dutch children during the last seven months of the war had their rations cut to 700 calories daily. These children lost weight, became anemic, failed to grow at the normal rate and their bones were decalcified. They complained of pains in the legs and could walk only with difficulty, Dr. J. H. P. Jonxis, of the Children's Hospital at Rotterdam, reports. The children were more susceptible to infection.

About five times as many children between one and five years died as normally would have. They did not die because they were starved to death, however. Bad hygienic conditions and lack of hospital beds were the chief causes of the deaths, especially of those children who died of diphtheria and dysentery. Even well-fed children, Dr. Jonxis reports, died of severe dysentery.

The effects of short rations depend not only on the number of calories in the daily diet but on the amount of protein, vitamins and minerals.

The men who voluntarily went on a famine diet at the University of Minnesota showed little or no signs of vitamin lack. The Dutch children also rarely showed signs of striking vitamin lack. Vitamin A was the only lack which was striking in a great number.

Americans who voluntarily cut their daily rations to share food with the hungry in Europe can guard against vitamin lack by planning their diets carefully as medically prescribed reducing diets are planned.

Science News Letter, May 11, 1946

MEDICINE

Radiation Injury Study

Finding swift methods of detecting atom bomb blast injury, best methods of treating it, and what after-effects to expect to be undertaken at Bikini.

➤ A NEW kind of blast injury, radiation blast of the atom bomb, will be studied, with the hope of learning how to reduce its danger to personnel, during the Crossroads Operation of Joint Task Force One.

Finding swift methods of detecting radiation injury, the best methods of treating it, and what late after-effects to expect are other parts of the mission of the Naval Medical Research Section of Joint Task Force One, Capt. R. H. Draeger, who heads this section, and Capt. Shields Warren, who will assist him reported as they made their plans at the Naval Medical Research Institute in Bethesda, Md.

The atom bomb, unlike any other weapon of warfare, can produce four blast effects, any one of which can kill. These are air blast, water blast, solid blast and radiation blast. The first three can be produced by ordinary high explosives, depending upon whether the explosion is in air, in water or in contact with a solid structure such as a ship.

Radiation blast, however, is produced only by the atom bomb. These blast radiations carry thermal and electromagnetic energy, producing burns or radiation sickness. An A-bomb victim who escaped the other blast effects might walk around apparently unharmed and without pain for 48 hours, and then suddenly collapse and die.

To prevent this happening in case of atomic attack, Capt. Draeger, Capt. Warren and their associates hope to learn during the Crossroads Operation what is the best way of telling quickly just how much radiation a man has absorbed in his body. Individuals working in laboratories where there may be radiation or radioactive hazards employ various devices for recording radioactivity. From these devices it is possible to tell whether or not the individual workers are in danger of getting too much radiation. One of the answers being sought in the tests will be to see whether more sensitive or more exact devices may be needed to indicate quickly enough the need for special medical treatment of atom bomb victims. Special blood tests may prove the best method of swiftly diagnosing radiation injury from atom bombs. A team of technicians has been, for weeks, getting special training in such blood testing at the Naval Medical Research Institute.

Penicillin, liver extract, iron compounds, chemicals derived from the blood's hemoglobin, and one of the new vitamins, folic acid, will all be tested as remedies for victims of the radiation injury of atom bombs. The blood and blood-forming organs are known to be damaged by radiation, which is the reason for testing as remedies such aids to blood formation as iron, liver, folic acid and hemoglobin derivatives. Penicillin, Capt. Warren believes, might prove lifesaving by holding disease germs at bay while the victim was suffering from too few white blood cells and until enough new ones were formed to give him some natural resistance to infection.

Whether the radiation injury from atom bombs will cause sterility in the victims or cause defects in such children as they might have will also be studied. While it will take many years before such genetic effects could be determined from following atom bomb survivors in Japan, laboratory animals and insects, such as drosophila, can provide the answers much faster.

The holds of the U.S.S. Burleson, which will be the laboratory ship for the Naval Medical Research Section of Joint Task Force One, are being converted into pens and suitable living quarters for fruit flies, goats, pigs, rats and a few specially bred mice.

The mice, provided by the National Cancer Institute, are from strains known to be highly susceptible to cancer, as well as from a resistant strain. They are being taken along so that scientists can learn what effects atom bomb radiation may have on cancer susceptibility or even on cancer itself. The goats were chosen for their unusual blood, which contains more and smaller red cells than other species, including humans, and thus will provide more material for studying the effects of radiation on the blood. The pigs were chosen because their skin is so much like human skin in its response to radiation.

An expert statistician, Capt. F. R. Lang of the Navy, will be among the 21 officers attached to the Naval Medical Research Section on the Crossroads Operation. Of the 21 officers, five are from the Army. The Chemical Warfare Service of the U. S. Army and the Biological Warfare Division are represented. In addition, there will be three civilian scientists. Among the 68 enlisted men will be 40 picked because they came from farms and have had experience with animals. Veterinarians are of course included in the force.

Seeds and soils will also be studied in collaboration with the Department of Agriculture, to learn how atom bomb radiation affects a region so far as its future crop production and habitability are concerned.

Science News Letter, May 11, 1946

ORDNANCE

Faster, More Powerful Rocket Motor Revealed

➤ WORLD'S NEWEST and most powerful rocket motor was unveiled at Patuxent River Air Station, by the Navy with a promise of greater distances and speeds than ever before reached by jet-propelled weapons.

The new motor would send the Navy's now-famous "Tiny Tim" rocket speeding through space at three times the speed previously possible for the missile.

Developed by Aerojet Engineering Corp., Pasadena, Calif., the new motor has been romantically dubbed "Moby Dick."

The thrust developed by the motor is greater than 30 tons, or one-third more than the "push" behind the Germans' V-2 rockets. It would shoot a "Tiny Tim" rocket at more than 2,700 feet per second contrasted with present speed of 900 feet per second, Navy rocket experts predicted.

Although "Moby Dick" is still in the experimental stage, new fields of distances and speeds for rocket weapons are expected from the latest advance.

Less powerful than "Moby Dick," but regarded as an important military advance is another rocket engine that was demonstrated by the Navy Bureau of Aeronautics. The compact, liquid-fuelled engine, known as CML, 2N, delivers a thrust of 350 pounds and fires for over two minutes. It was developed for the Navy's high-speed Gorgon pilotless aircraft.

Science News Letter, May 11, 1946

All *lawns* need spring care because turf grasses are cool-weather growers.

PHYSICS

Radio Waves Absorbed

Water and oxygen in the atmosphere absorb very short radio waves and the propagation of radar signals is affected as a result.

➤ VERY SHORT radio waves are absorbed in the atmosphere by water vapor or oxygen and the propagation of radar signals is affected as a result.

This war discovery, made at the Radiation Laboratory of the Massachusetts Institute of Technology, was announced to the American Physical Society at its first postwar radar meeting in Cambridge, Mass.

Molecules of water in the atmosphere and the oxygen in the atmosphere both absorb and radiate what might be thought of as spectral lines in the microwave region. Light that we see and the invisible light that can be photographed is all caused by the way in which the atoms themselves vibrate or resonate.

The bright yellow line of sodium vapor in the lamps that are sometimes used to light highways is a good example of the kind of light that is given out by atomic resonance of one kind of atom, that of sodium. The water vapor and the oxygen molecules in a very similar way absorb and emit certain wavelengths of radiation in the range of the very short radio waves.

This is not too surprising since light, whether infra-red, visible, ultraviolet or X-rays, is the same kind of radiation as the radio waves except that they are much shorter in wavelength, that is, higher in frequency.

In the case of water and oxygen molecules, they are whirling around and they are made to whirl faster when the radio waves are being absorbed. This is what is called resonance. The amount of energy involved is very small indeed.

Water vapor molecules absorb a wavelength of one and a quarter centimeters, while the oxygen molecules absorb a wavelength of half a centimeter. These waves are mere fractions of an inch and much, much shorter than the waves used in ordinary broadcasts. These studies are important in radio transmission because the water and the oxygen in the air do absorb a considerable amount of the energy, and that affects the transmission.

Among the physicists presenting papers on these researches were Dr. L. A. DuBridge, of the University of Rochester and during the war director of the Radiation Laboratory, Dr. J. H. Van Vleck of Harvard, Dr. Robert Beringer, now of Yale, Dr. R. L. Kyhl, of the Radiation Laboratory, Dr. R. H. Dicke, now of Princeton, and Drs. Stanley H. Autler, Gordon E. Becker and J. M. B. Kellogg of Columbia University's Radiation Laboratory.

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AERONAUTICS

Flying Wing Bomber Looks Like Giant Boomerang

➤ THE NEW GIANT Flying Wing bomber and cargo plane, that looks like a gigantic boomerang, is ready to fly. It is all wings; no tail and no familiar fish-shaped body.

Two broad wings, joined at their bases, form a widespread V. Four pusher propellers are within the angle of the wings. A few "bubbles" on the upper surface house defensive armament in the bomber version.

The nose of the plane is the front junction of the wings. The four engines are carried toward the rear of the wings in submerged housings which do not protrude from the surface. Crew and cargo are carried within the broad thick wings themselves.

The Flying Wing is the nearest approach to an airplane consisting only of a pure supporting surface. Almost every portion of it contributes to lift in return for the drag it causes. Lift, the raising force on the wings of an airplane, enables it to fly, and the more lift it has, the better able it is to carry loads. The aim of aircraft designers has always been to obtain more lift and less drag. In the conventional plane only the wings contribute to lift; the fuselage, tail, and all other extraneous parts create drag.

This new plane, the successor of several experimental models, will be known as the Northrop Flying Wing or the Army XB-35. It was built by Northrop Aircraft, Inc., for the Army as a giant bomber. However, it can be easily converted into a cargo ship, and some day may become a familiar commercial cargo-carrier.

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***ALL WINGS**—Four eight-bladed co-axial propellers, driven by four Pratt and Whitney Wasp Major engines, are expected to push this Northrop Flying Wing XB-35 long-range bomber along at high speed. Wing tip nearest the camera shows one of the wing slots which aid the Flying Wing's efficiency at slow speeds. At high speeds, where the slots are not needed, automatic doors close over them, "streamlining" the smooth surface.*

MEDICINE

Pituitary Gland Implicated In Search for Cancer Cause

➤ POSSIBILITY that the pituitary gland is involved in the cause of cancer is being explored by Dr. Henry K. Wachtel of the Cancer Research Laboratories at Fordham University.

The pituitary is a small gland located in the head but it has far-reaching effects on body chemistry and functions. Fatty extracts from the pituitary glands of cattle caused cancer in more than one-fourth of a group of 67 white mice injected with the extracts, Dr. Wachtel reports (*Science*, May 3). The cancer-causing power of these extracts, however, is evidently low, Dr. Wachtel states.

The experiments are part of a search for the cause of cancer which many scientists the world over started when it was discovered that chemical substances from coal tar could cause malignant growths.

These cancer-causing chemicals are related to some chemicals normally present in the body, such as hormones produced by glands. One theory of cancer cause has been that something went wrong with the body chemical processes so that cancer-causing chemicals were produced or developed from the harmless ones.

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ELECTRONICS

Focusses Radio Waves Into Sharp Beam

➤ A NEW METAL lens, which can focus radio waves into a sharp beam much as a glass lens focusses light, will give impetus to microwave communication, it is expected, and will find its most widespread application in microwave radio relay systems. It is announced by the Bell Telephone Laboratories where it was developed.

The relay systems in which the new lens will be used are designed primarily as adjuncts to the telephone network, but they are expected to be used in transmitting pictures, radio broadcasts and television programs. Aside from its use in such microwave communication systems, the lens is also expected to be of value in the peacetime development of radar as an aid to sea and air navigation.

The necessity for relay stations in microwave communications is due to the fact that these very short waves, unlike longer commercial broadcasting waves, do not follow the curvature of the earth but shoot off into space. They can be transmitted only as far as there is a clear, unobstructed, straight-line path, at best as far as the horizon. In the new channel between New York and Boston, for example, there will be eight jumps. To obtain this short-range transmission between successive relay stations with peak efficiency and least interference, the wave energy must be focussed into a narrow beam.

This new lens for radio waves bears no resemblance to familiar optical lenses. It is an array of metal plates. These plates are designed to focus the radio waves as effectively as a solid lens might focus them if due regard is given to the fact that the edges of the wavefront is advanced rather than retarded in transit. The plates are built to duplicate the action not only of convex and concave lens but also of other optical devices, such as half and quarter wave plates and prisms.

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ENGINEERING

Two New Solvents Clean Fouled Engines

➤ FOULED AUTOMOBILE engines, crankcases, and lubrication systems can now be better cleaned, it is claimed, without taking them apart, by the use of two improved cleaning solvents announced by the Standard Oil Company of Indiana. One is designed to remove loose crankcase sludge and clean oil screens and passages; the other is to remove varnish, gum and carbon deposits from engine parts, remove combustion chamber deposits, and clean fouled spark plugs.

Both new products have high solvent powers for resins and gums formed by deterioration of motor oil and low volatility with high flash point. They will be known by the trade names Stano-Purge and Stano-Vim. The first is the crankcase cleaner, the second the engine cleaner. Stano-Purge is more than 90% a material chemically related to toluene to which is added a lubricant to prevent injury to the engine during the use of the solvent.

Stano-Vim is a low-viscosity, low volatility fluid with a mothball-like odor. It is not claimed to be the first fluid developed for cleaning engines, but it is claimed that it has unusually high solvent effect on resins and gum. It is not suitable for use in supercharged engines or in engines fed by injection.

Science News Letter, May 11, 1946

IN SCIEN

GENETICS

Cancer and Hair Color Found Linked in Mice

➤ INBORN SUSCEPTIBILITY and resistance to cancer are linked with hair color, at least in mice, Dr. Leonell C. Strong of Yale University School of Medicine has found.

He crossed black and brown mice and injected the offspring with a cancer-causing coal tar chemical, methylcholanthrene. The results showed that the chromosome that carried the gene determining black hair color also carried the gene determining that the mice would be susceptible to cancer induced by methylcholanthrene.

The genes that determine cancer resistance or susceptibility in mice apparently obey the same laws of Mendelian heredity as the genes that determine hair color and other inherited characteristics, Dr. Strong states. (*Science*, May 3.)

Mice are not men and the findings may not apply at all to cancer in humans. However, they seem to be bringing scientists closer to full knowledge of the genetic or constitutional factors that may be involved in the development of cancer.

Science News Letter, May 11, 1946

ICHTHYOLOGY

Razor Clams Caught By Using Table Salt

➤ SALT CAN BE used to catch razor clams.

By waiting until the sandbar in which they live is mostly out of water, several dozen clams have been caught by merely sprinkling table salt along the bar, Robert Alexander states in *Frontiers*, a magazine of natural history. The clams appear at their holes and push themselves in jerks until their long narrow shells lose balance and fall over. By the time the turned tide has covered the bar with water, the clam-seekers have a well-filled basket.

When the salt seeps down into their holes, the mollusks come out. Some believe the salt irritates them so much they leave their holes to get away from it. But if they should dig down into the sand and escape, no amount of salt will induce them to return to the surface.

Science News Letter, May 11, 1946

NCE FIELDS

MEDICINE

Penicillin X May Fail When Swallowed

➤ PENICILLIN X, an especially powerful penicillin for checking disease germs, may fail to cure a patient if he swallows the drug instead of getting it by hypodermic needle injection.

Tests showing this are reported by Drs. Manson Meads, Edwin M. Ory and Maxwell Finland, of Boston City Hospital and Harvard Medical School. (*Science*, April 26.)

Germs causing gonorrhea, meningitis and blood poisoning were from two to eight times more vulnerable to penicillin X than to penicillin G, the doctors found from test tube experiments comparing commercial lots of penicillin containing more G or more X.

Injections of penicillin X gave a higher level of penicillin activity in the blood than injections of penicillin G. But when the two kinds of penicillins were swallowed, the effect was reversed. The results suggest that penicillin X is not absorbed as well as penicillin G when given by mouth.

Science News Letter, May 11, 1946

NUTRITION

Fight for Bread Is Fight for Vitamins

➤ GOVERNMENT officials and others fighting to get most of our shortened wheat and flour supply baked into bread instead of cake and pie are fighting to keep us as well nourished as possible.

White bread and rolls, even though faintly gray at present, supply more vitamins, iron and protein than cake and pie.

Slice for slice, a piece of cake or pie might furnish more calories than a piece of bread, because of the extra fat and sugar in the pie or cake. It would furnish less protein, however, because the protein is supplied by the flour and cake is apt to have less flour than bread. If milk and eggs are used in baking cake, the protein content would be increased by the amounts in these ingredients.

The bread and rolls supply more vitamins and iron because under War Food Order No. 1 they must be enriched with extra amounts of iron, and three B vitamins, thiamin, riboflavin and niacin. Cake and pie may be enriched if the baker wishes to add these ingredients, but they need not be.

The reason for bread enrichment is to supply the vitamins and iron which many persons would not otherwise get from their daily diet. People with limited money for food, who are most likely to go short on vitamins and iron, are usually heavy bread eaters. They cannot afford much cake or pie so they will not be missing much in vitamins by lack of enrichment of these products.

With flour supplies limited, it is important that most of it go into the most nourishing form of baked products and into one on which very many people depend for the mainstay of their daily diet.

Science News Letter, May 11, 1946

CHEMISTRY

1080, Deadly to Rats, Found Harmless to Fish

➤ 1080, THE NEW rat-killing chemical so poisonous to rodents that two tenthousandths of an ounce will kill a full-grown rat, seems to be harmless to fish. Two zoologists, Joseph E. King of the U. S. Fish and Wildlife Service and Prof. William T. Penfound of Tulane University, tried out some solutions of 1080 on fingerling bream and bass, and found that the young fish could swim around indefinitely in water containing as much as 370 parts per million "with no apparent discomfort." (*Science*, April 19.)

Science News Letter, May 11, 1946

PSYCHOLOGY

Don't Worry If Child Confuses Fact With Fancy

➤ DON'T BE disturbed if you have a child who confuses fact with fantasy.

Most children do, Martha Wolfenstein of Hunter College told the Eastern Psychological Association meeting at Fordham University in New York.

The psychologist reported that mothers who read stories to their children rarely see any relation between the children's story and real life. But children often relate such stories to the immediate problems in their lives. And the more imaginative the mother, the more productive of fantasy will be the child's mind.

When a mother reads a story to a child, her reactions are sometimes very different from that of the child by her side whose realistic reception of the story might be amazing to the parent.

Science News Letter, May 11, 1946

ASTRONOMY

Emissions of Sun Cause Magnetic Disturbances

➤ OCCURRENCE of magnetic disturbances on the earth seem to be correlated with the solar corona and the existence on the sun of regions of intense coronal emission. A two-year study of coronal and magnetic data shows that, on the average, magnetic disturbances occurred when intense emission-regions of the solar corona were situated in the eastern hemisphere of the visible solar disk.

A report on this study was given at the joint meeting of the International Scientific Radio Union and the American Institute of Radio Engineers by A. H. Shapley of the Carnegie Institution of Washington and W. O. Roberts of the Harvard College Observatory, Climax, Colo. The observations were made at the Colorado site. One purpose of the study and report is to show the practical advantages and limitations of the correlation when applied to forecasting short-term disturbances.

"The basic objective of the solar-terrestrial correlation," Mr. Shapley stated, "is to improve techniques of short-term forecasts of the behavior of ionospheric layers for use in radio communications and allied problems. For the successful attainment of this objective the coronal data have definite usefulness."

"There is, however, still considerable uncertainty in the coronal data and in the use that it is so far possible to make of them," Mr. Shapley continued. "It is hoped that further analysis will result in better methods of forecasting through improved knowledge. A study of the effect of latitude-distribution on the nature of the correlation is perhaps the most important of these, inasmuch as the active solar regions encountered during the test period were predominantly in low latitude, belonging to the waning cycle, whereas regions of the new cycle, in high latitude have since become more numerous."

"Probably we can never obtain completely trustworthy forecasts from coronal observations," he stated. "But, since we have derived a correlation that seems to have a higher significance than those derived from other solar phenomena, and since there is some reason to expect that physical conditions of the solar corona can influence those of the ionosphere, the authors believe that investigation of the coronal-magnetic relationship merits further intensive study."

Science News Letter, May 11, 1946

CHEMISTRY

Our Perfumed World

Wide use of perfume made possible by inexpensive synthetic odors; fragrance of a few flowers never captured in nature has been duplicated.

By MARTHA MORROW

See Front Cover

➤ WE LIVE in a perfumed world. All soap, even the cheapest type of laundry soap, is perfumed to kill the fatty odor of the soap itself. Hair tonic, tooth paste, bath powder and baby oil are scented. Shaving cream and vanishing cream incorporate a not-too-powerful fragrance. Perfume may compose as much as 2% of a girl's lipstick, not only to impart a pleasant fragrance, but to cover up the odor of one of the chief ingredients of lipstick, castor oil.

The fresh smell of the out-of-doors is brought into an air-conditioned building through perfume.

The typical odor that warns of escaping gas is man-made. The obnoxious odor that is characteristic of toxic gas was created by the perfume industry so that a man's nose would tell him of the presence of the colorless, tasteless gas before he was overcome by it.

Unpleasant odors in fabrics are covered up by perfume. The smell of synthetic rubber must be changed if a rubber toy is to find favor with its young owner. Medicine is made more palatable by giving it a pleasant flavor, which in the last analysis means a pleasant scent.

Synthetics Indispensable

There are few industries today that do not use the raw materials of perfume or materials that have been perfumed. But perfume could not meet such a widespread demand were it not for the new fragrant materials made possible by modern science. Synthetics are indispensable to every perfume manufacturer.

It takes 33,000 pounds of violet leaves (with 2,000 flowers for each pound of leaves) to yield a pound of the natural oil that imparts the odor. Natural oil of violet leaf remains a treasured material for fine perfumery, but modern chemistry has produced several substances having a violet-type odor.

A ton of roses is needed to obtain ten ounces of the fragrance-imparting oil. Today a somewhat similar odor can be produced in the laboratory. The modern perfumer will tell you that both are equally important to him, the attar of rose and the synthetic.

No satisfactory way has ever been found of extracting the natural oil from lilacs, like those in the staff photograph on the cover of this SCIENCE NEWS LETTER, thus that illusive scent can not be gotten from nature. But synthetic lilac, an exquisite reproduction of this favorite scent, today is available to everyone. Similarly, though a natural lily-of-the-valley oil has been extracted, the perfume having that odor is commercially available only through the use of synthetics.

What are the synthetics that go to make up this violet, lilac, rose or lily-of-the-valley? Each odor does not consist of a single chemical, but rather of a group mixed together in careful proportions. The single chemicals in the group may or may not have the odor of the flower, but the group as a blend can capture it beautifully.

For violet, for instance, there is ionone, one of the first perfume synthetics ever made. Ionone is made from a chemical called citral which is found in Indian lemongrass oil. For the lilac odor, one of the most common ingredients is terpineol, made from materials found in the Southern pine tree.

For the rose odor, the perfumer chooses phenyl ethyl alcohol, which, though found in the rose, is made synthetically from coaltar derivatives. For the lily-of-the-valley, one of the most precious odors is hydroxycitronellal, itself not known in nature, but made from materials found in the well-known mosquito repellent, oil of citronella. These are but a few of several hundred synthetics which the perfumer is constantly using.

Every time you smell a gardenia, you are smelling not the flower, but the oil contained in it. It is this oil, that you have probably never seen or felt, which must be extracted. The oil that gives fragrance to a shrub or tree is sometimes found in the petals, sometimes in the seeds, and often hidden in the bark. The natural oil contained in the petals of a flower is the most precious. Orris, resembling violet in fragrance, comes from a root. Oil is gotten from the peel of the fruit of an orange tree. Cinnamon oil comes from the leaf and the bark.

A few communities throughout the world are outstanding centers for these essential oils. In these localities certain flowers, grown in profusion, are most fragrant, for the odor varies under different climatic conditions just as fruit from some areas is more tasty than from others.

The town of Grasse, in southern France, is renowned among perfumers for its jasmin, tuberose, jonquil, rose, carnation and less delicate but nonetheless popular oil of lavender. A little isle off the coast of Madagascar, called Reunion, supplies the world with such important oils as geranium, ylang ylang and vetivert.

A few essential oils are produced in America. Oil of peppermint comes from Michigan. Pine oil is produced in conjunction with our Southern turpentine

MAKING PERFUME—One of a battery of vacuum stills that isolates from a crude chemical substance, such as coal tar, the usable perfume component is shown at the du Pont plant, New Brunswick, N. J. The fragrance being created here is aubepine, a characteristic odor of hawthorn.

industry. Oil of spearmint, some natural wintergreen, the ancient cedarwood and rank wormwood are also secured in the United States. Citrus oils are extracted from our lemons and oranges. But the natural oils produced in this country, though important, do not include any of the gems of the perfume industry.

Natural oils may be extracted in several ways. Steam distillation, the cheapest of the methods, is used in extracting a wide variety of oils that come from all parts of plants that are grown in many parts of the world. It is used for sandalwood that comes from a tree; vetivert, that comes from roots; and patchouli, that comes from leaves.

The roots, leaves or twigs are boiled in water. Steam blown through the mixture carriers the vaporized oil to a condenser where the water and oil are condensed as liquids. Because the oil is not miscible with water, it can easily be removed. But many of the most delicate and expensive flowers cannot be treated in this way, as heat and water change their character and destroy their value.

A process that has changed little in the past few centuries is that of enfleurage. Flowers brought fresh to the factory are placed by hand, a few hours after being picked, on glass trays coated with fat, primarily lard. The petals are allowed to remain in contact with the fat for about a day, during which time the odorous constituent is absorbed from the flowers. The fat is then washed with alcohol or benzene to separate the perfume from it. This hand process still is used extensively in France to recover the perfume from jasmin and tuberose.

One of the oldest processes for the extraction of oil is maceration. It consists of immersing the flower in warm fats or oils. For this purpose, the ancients used olive oil and other vegetable oils, but today, where this process is used at all, animal fats are employed.

A volatile solvent such as petroleum ether or benzene is used to extract the natural oils from such flowers as orange blossoms and mimosa and is also used for the jasmin. By a series of processes the natural oil is transferred from the flower to the solvent, which is then evaporated, leaving the perfume oil.

Such odors as oil of lemon and other citrus products are extracted simply by pressing on the peel, a process known to the industry as expression.

A thorough description of these processes and of other aspects of perfume and odor is found in Edward Sagarin's recent book, "The Science and Art of Perfumery."

Three types of ingredients are used in the making of perfumes. Odoriferous components such as natural oils and synthetics supply the main part of the perfume odor, and impart the pleasing fragrance. A large variety is usually employed, perhaps a score or two in a single perfume. Then there is the diluting agent, a specially prepared alcohol. This may either be produced by fermenting molasses or grain, or it may be created synthetically. The fixative blends the many odors into one and gives the perfume its lasting quality. Good perfume will keep its same fragrance for many hours on the handkerchief or hair, and for many years in a well-sealed bottle.

Until recently the fixatives were exclusively of animal origin and so great was the demand for musk that the male musk deer of Tibet, from whose glands the natural musk grains are extracted, was in danger of being exterminated. A means was recently found, however, of using the tiny glands of muskrats trapped in Louisiana's bayous as a fixative. This new natural musk, made possible through discovery of a way to oxidize the almost odorless musk alcohols and convert them to the extremely odorous musk ketones, has proven an excellent fixative.

A number of musk substitutes has been developed, but while somewhat similar to natural musk in their odor effect, they cannot be said to have the power, strength or depth of natural musk.

A sweet odor alone is not pleasing. To obtain the most liked fragrance, combinations must be chosen from the four types of odors—sweet, acid, burnt, and the unpleasant group known as goat odors. Some of the most valued substances for perfumes, such as civet obtained from the civet cat of Ethiopia, are extremely evil-smelling. These materials have been of special importance lately because most of the perfumes popular today contain one or several unpleasant odors, used in small proportions where it becomes a part of a pleasant bouquet.

Perfume experts are continually mixing essential oils and synthetics in minute quantities to create new perfumes that will be subtle and lasting in their fragrance. But the final test for a good perfume lies with the olfactory senses. No machine has yet been invented that can analyze smell—the human nose is still the superior perfume sniffer.

Science News Letter, May 11, 1946

ASTRONOMY

Sailors Report Seeing Sky Fireworks

➤ THE OLD SAYING that all a sailor sees is the sea is refuted by reports of celestial fireworks received by the U. S. Navy Hydrographic Office.

Sailors have seen a red and yellow meteor flashing through the skies over the Atlantic and another greenish-white fireball with a small tail. A ship's officer in the Caribbean reported a bright greenish-blue meteor.

Even seeing the sea can have its interesting side, too, for a ship in the Pacific off Panama reported sailing through large patches of maroon-colored water.

Science News Letter, May 11, 1946

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- How Eyes in Motion Reveal Secrets
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Do You Know?

Peach trees need ground limestone plus a complete fertilizer.

Half the total income from *poultry* in America comes from the sale of eggs.

Victory gardens are needed again this year because of the world shortage of food.

Mohammedans consider the *praying mantis* holy, and it a sacrilege to kill one of these insects.

Sterilization of *pruning tools* used by tree surgeons is sometimes necessary; it is now known that canker stain, a deadly fungus disease of the plane tree, is carried on contaminated tools.

A process of making *Prussian blue*, an important pigment in commerce, has been developed in India using ferrous sulfate and potassium ferro-cyanide to obtain ferrous ferrocyanide which is then oxidized by potassium chlorate.

The best method of determining the correct harvest time for *peppermint* is by a laboratory analysis of the oil for its free menthol content, as this may decrease by 30% if the crop is cut too soon or too late.

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PHYSIOLOGY

New Circulation "Map"

Tracers used to study the permeability of gases in living cells of the human body. Blood circulation mapped in experiments with intact human subjects.

➤ A "MAP" of blood circulation and a new theory of the permeability of gases in living cells of the human body have resulted from wartime research by the Aero Medical Unit of the University of California.

The circulation of the blood was mapped in experiments with intact human subjects. Radioactive argon, xenon and krypton, produced in the atom-smashing cyclotron, were used to trace the flow of blood in all tissues of the body.

The experiments verify some theories which have been formulated by scientists but have been largely unproved because, since the time of the ancient Greek, Aristotle, researchers have had no way of studying the circulation without seriously damaging experimental human subjects.

The circulation "map" indicates that there is a large central pool of blood, consisting of about 70% of the body's supply, which circulates rapidly between the heart, kidney, liver, thyroid, lungs and brain. Lying outside this pool, in the extremities and other body parts, is the remaining 30%, which streams in and out of the central pool at a sluggish rate.

Within 15 seconds after it is taken into the body, material becomes well mixed with the fast-moving central pool, but it takes as much as 15 minutes for such material to reach the outlying pool.

Subjects were allowed to breathe radioactive argon, xenon and krypton—all inert, rare gases—through a metabolator. Geiger counters placed over various organs, such as the head, abdomen, legs, hands, arms, fatty areas, and the vital organs, gave a picture of the distribution, rate of accumulation and speed of circulation in all these parts of the body. Circulation in the skin was measured by placing a Geiger counter over the skin between the thumb and index finger. Brain circulation was measured by placing Geiger counters on the head; since the circulation of gas in the bone and other parts of the head is very slow—almost negligible in the early stages—the recordings on head circulation were a measure of brain circulation.

The scientists also determined that the membrane of body cells apparently offers no barrier to the exchange of gas between cells and the blood. The rate of exchange of gas between cells and the blood depends on the amount of gases the blood brings into contact with the cells; in other words, the efficiency of the circulation system determines the amount of exchange of gases.

Permeability of the cells was determined by measuring the excretion by the whole body of radioactive gases and nitrogen.

In the metabolism of the body gas exchange in cells is of extreme importance. The cells breathe oxygen, nitrogen and other gases just as the body as a whole does. When the circulatory system is unable to carry sufficient gases to the cells of the various parts of the body the cells and the whole body suffer.

The importance of gas exchange in

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aviation medicine prompted the studies. High-altitude sickness, or bends, occurs among persons with poor circulation, while those with efficient systems are relatively resistant because sufficient oxygen is carried to the body cells to rid them of the nitrogen which causes the disease.

The research was performed largely by Dr. Hardin Jones, instructor in medical physics. Dr. John H. Lawrence, director of the Aero Medical Unit, supervised the work, which was sponsored by the Office of Scientific Research and Development.

Science News Letter, May 11, 1946

GENERAL SCIENCE-EDUCATION

25 High School Seniors Honored in Tennessee

➤ TWENTY-FIVE of Tennessee's high school students have been picked in the first Tennessee state-wide Science Talent Search as the most promising "scientists of tomorrow", Dr. Hanor A. Webb, president of the Tennessee Academy of Science, has announced.

The five girls and 20 boys who are winners are eligible for scholarships in Tennessee colleges and universities.

The Tennessee search was run concurrently with the Fifth Annual Science Talent Search for the Westinghouse Science Scholarships, as a cooperative effort with Science Clubs of America, administered by Science Service, Washington, D. C.

"The members of the Tennessee Academy of Science are firmly convinced that youth with an aptitude for science is one of the country's great national resources," Dr. Webb said. "This statewide Science Talent Search will make it possible for certain Tennessee young scientists to continue their careers in science and will help to remedy the nation's grave deficit of scientists."

Science News Letter, May 11, 1946

CHEMISTRY

Wartime Smoke-Pots Used to Protect Apples

➤ SMOKE-POTS, that formed a protective screen for troops during the war, were used to protect Vermont's apple crop.

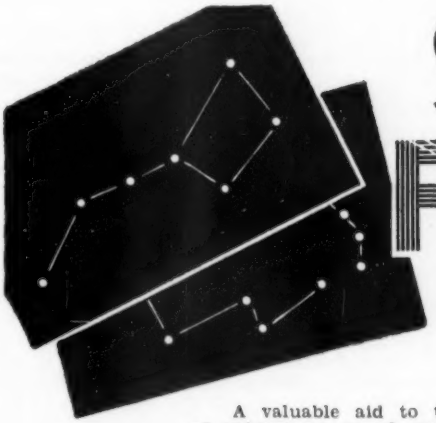
Six hundred of the 30-pound smoke-pots were rushed to Bennington County, Vt., to combat below-freezing temperatures that menaced the McIntosh apple orchards.

The smoke-pots, burning hexachlorethane, produce a white, non-gritty, sootless and harmless smoke. Each pot smokes for about 10 minutes. The heat will not raise the temperature appreciably, but it does raise the dew-point enough to prevent frost.

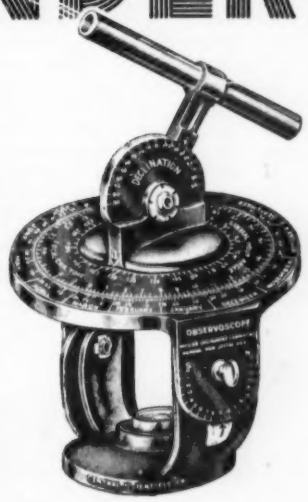
"Operation Smoke-Pot" is being handled by the federal and state agricultural authorities in cooperation with the county agricultural agent of the University of Vermont Extension Service.

Chemical Warfare Service has 52,000 smoke-pots of the 30-pound size and countless others of varying sizes. They were offered to the Surplus Property Division, but the latter agency said the smoke-pots were useless and should be junked.

Science News Letter, May 11, 1946



STAR FINDER



A valuable aid to the student of astronomy or of navigation has been designed to locate celestial bodies quickly and accurately. The Millar Observoscope is made on the same principle as the equatorial mounting of the astronomer's telescope. This precision instrument is constructed of impact-resistant phenolic plastics with declination and latitude scales impressed in the body of the instrument. Impressed also are scales which indicate month, clock and sidereal hour angles.

Use of the instrument helps the student in visualizing the coordinate system and the apparent motion of the stars, while locating instantly the desired star. Intricate and confusing charts become unnecessary. In use, the latitude scale is set to the latitude of the observer and the civil time, opposite the day of the month. The star or constellation to be observed is looked up in the list of 55 stars provided and the sidereal hour angle set and declination indicated. The instrument is then oriented to true north and the star or constellation will be seen in the viewing tube.

The instrument may be mounted on a camera or astronomical tripod or simply placed on its weighted base for accurate observations. It may be used equally well to locate true north, to indicate civil time or latitude if all known settings are made and the sight tube is pointed to a known star. It is designed for use north of the equator. For use south of the equator, a special instrument can be supplied.

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• Books of the Week •

CAA STATISTICAL HANDBOOK OF CIVIL AVIATION—*Government Printing Office,* 129 p., tables, paper, 25 cents. A reference volume which brings together in one place official statistical data on civil aviation development in the U. S.; users may request the CAA to send them change sheets as issued during the year.

AN ENEMY OF THE PEOPLE: Antisemitism—James Parkes—*Penguin*—151 p., paper, 25 cents. A study of the historical, sociological and psychological aspects of antisemitism.

HANDBOOK OF INFECTIOUS DISEASES: With Notes on Prophylaxis, Serum Treatment and Vaccination—Staff of the Cantacuzene Institute—*League of Nations,* 331 p., tables and illus., paper, $1.25. Facts relating to infectious diseases, their diagnosis, treatment and prevention, gathered in the light of experience gained during both World Wars and the intervening period.

LUTHER BURBANK: A Victim of Hero Worship—Walter L. Howard—*Chronica Botanica,* 333 p., illus., paper, $3.75. An analysis of the life and work of the late well-known American plant breeder. Volume 9, No. 5/6 (pp. 299-522) of Chronica Botanica.

MATHEMATICIAN'S DELIGHT—W. W. Sawyer—*Penguin,* 215 p., diagrs., paper, 25 cents. The author attempts to show what mathematics is all about; how mathematicians think; when mathematics can be of some use. A book based on the theory that mathematical reasoning can grow gradually and naturally through practical work with real objects.

THE NATIVE CULTURE OF THE MARIANAS ISLANDS—Laura T. Thompson—*Bernice P. Bishop Museum,* 48 p., illus., paper, $1. Bernice P. Bishop Museum Bulletin 185.

THE PAPER INDUSTRY—Josephine Perry—*Longmans,* 128 p., illus., $2. The story of the processes of manufacturing paper from the tree farms to the chipping machines and the chemical changes necessary to make the finished paper product.

PATH OF FLIGHT: Practical Information about Navigation of Private Aircraft—George Sidney Stanton — *Government Printing Office,* 32 p., charts and tables, paper, 40 cents. A discussion of navigation limited to the needs of the private pilot without instrument rating.

PEACE AGENCIES—Carleton Mabee—*Occupational Index, Inc.,* 25 cents. Information about employment in peace agencies. Occupational Abstract No. 92.

THE PETROLEUM INDUSTRY—Josephine Perry—*Longmans,* 128 p., illus., $2. The early struggles of the crude oil business which had its beginnings in Pennsylvania in 1859; the tremendous advances which have been made in obtaining, processing, and transporting petroleum; and the by-products and future developments of the petroleum industry.

PHOTOENGRAVING—Ruth Selina—*Occupational Index, Inc.,* 25 cents. Information about employment in the photoengraving trades. Occupational Abstracts No. 91.

PHYSICAL CHEMISTRY FOR PREMEDICAL STUDENTS—John Page Amsden—*International Chemical Press,* 298 p., diagrs. and tables, $3.50. A textbook written especially for a one-semester course for premedical students, including only those portions of elementary physical chemistry which will be of value to the medical student in his later professional work.

PLANTS OF THE MANU ISLANDS—T. G. Yuncker—*Bernice P. Bishop Museum,* 73 p., map, paper, $1. Bernice P. Bishop Museum, Bulletin 184.

THE POPULAR MEDICAL ENCYCLOPEDIA—Morris Fishbein, M.D.—*Doubleday,* 540 p., illus., $4.95. Written for the layman; it tells about the human body—its functions, its disturbances, and latest methods of prevention of its disorders.

REALM OF FLIGHT: Presenting Practical Information About Weather in Relation to the Piloting of Private Aircraft—George Sidney Stanton—*Government Printing Office,* 41 p., tables and illus., paper, 60 cents. A brief text designed to help the pilot by giving him a general background of weather knowledge together with basic facts about sources of weather information, interpretation of weather maps, how to avoid dangerous conditions, etc.

RECREATION—Helen R. Blank—*Occupational Index, Inc.,* 25 cents. Information about employment in recreation leadership. Occupational Abstract N. 90.

SEX AND THE SOCIAL ORDER—Georgene H. Seward—*McGraw,* 301 p., tables and illus., $3.50. A phylogenetic approach to problems of sex in the life of the group.

SONGS OF UVEA AND FUTUNA—E. G. Burrows—*Bernice P. Bishop Museum,* 121 p., paper, $2.50. Bernice P. Bishop Museum Bulletin 183.

SOUTH AMERICAN ZOO—Victor W. Von Hagen—*Messner,* 182 p., illus., $2.50. Informative and lively descriptions of the appearance, habits and personalities of the unfamiliar creatures that make up the animal life of South America; illustrated by Francis Lee Jaques. A book for young people in the later grades or high school.

UNFINISHED BUSINESS IN AMERICAN EDUCATION: An Inventory of Public School Expenditures in the United States—John K. Norton and Eugene S. Lawler—*National Education Assn. and American Council on Education,* 64 p., tables and illus., paper, $1.

THE WEATHER FOR A HOBBY—Raymond Yates—*Dodd,* 172 p., diagrs. and illus., $2.75. How to predict the weather and make the instruments needed to study it.

WHAT YOU CAN DO FOR ANGINA PECTORIS AND CORONARY OCCLUSION—Peter J. Steincrohn, M.D.—*Doubleday,* 254 p., $2.50. A book for the layman which answers practical questions and gives practical advice to all sufferers from coronary trouble.

Science News Letter, May 11, 1946

Alumina, source of aluminum metal, can be made from potassium alum by a method developed by the U. S. Bureau of Mines in its program to make America independent of foreign minerals as far as possible.

Nematode worms in the soil like watermelon roots about as much as people do the melon; if the nematodes sap the roots, the melons do not grow, but a little chloropicrin in the soil, spotted where the seeds are to be planted, kills the worms.

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BOTANY

NATURE RAMBLINGS

by Frank Thone

Treacherous Triad

➤ POISON IVY season is with us again. Just when it gets to be really nice weather for picnicking, and the kids look forward to hikes in the country and perhaps a summer camp, once school is out, this three-leaved enemy of the human epidermis reaches its fullest, most malignant development. Only the drier parts of the country, from the High Plains to the crest of the Sierra and Cascades, are free from this ill weed and its almost identical twin, the West Coast poison oak.

What to do about poison ivy? If you know you are sensitive to it, the very best remedy is not to have anything to do with it. The plant is easy to identify; a vine climbing tree trunks, stone walls and the like with myriads of aerial roots, or a gray-barked, sparsely-branched shrub, with glossy, three-parted leaves. The old warning jingle, "Leaflets three, let it be," is perfectly good field botany so far as poison ivy and poison oak are concerned.

Margins of the leaflets may be deeply lobed, shallowly notched, or altogether smooth. Poison ivy is an exceedingly variable species, and you can often find considerable differences among the leaves on the same plant. The effort, sometimes made on the basis of leaf shape, to set apart an Eastern "poison oak" from poison ivy is futile: there are just too many transition shapes among the leaves.

Poison-ivy flowers are loose clusters of tiny, greenish-white bloom; the berries change from green to pallid gray-white in autumn. Curiously enough, some birds seem to be able to eat them with impunity.

If you *must* go where there is poison ivy, a preventive treatment that protects most persons can be made by dissolving about a teaspoonful of ferrous sulfate (copperas) in a pint of half-and-half mixture of alcohol and water, and adding a little glycerin. Spread this on exposed portions of the skin and let it dry without wiping. Curative properties are also claimed for this mixture; but prevention is always better than cure.

About two persons in three are sufficiently sensitive to poison ivy to suffer after-effects from contact with it. The lucky remaining third either develop few and inconsequential blisters, or even handle the pesky weed with as much impunity as if it were so much grass or spinach. Such fortunates should, however, remember two things: (1) it is always possible to lose that immunity, without notice; (2) if they do heroically pull up a patch they should immediately rinse their hands in rubbing alcohol or wash them with strong soap, for subsequent contacts with non-immune persons can transfer the poison to them.

Science News Letter, May 11, 1946

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·New Machines And Gadgets·

⚙ *LIGHTED writing pad holder for truck drivers and police scout cars has a flat base to hold the paper and an electrical flashlight housing standing upright at one end. A globular cover and lens directs the light downward onto the pad, while a hinged clip on the housing holds the pad in place.*

Science News Letter, May 11, 1946

⚙ *REPEATING flash bulb for photographers can be used for several thousand individual flashes of daylight brilliancy. Its bulb is similar to the three-pronged projection lamp. Inside is a gas-filled coil tubing running between two electrodes. Condenser discharges through the coil produce the flash.*

Science News Letter, May 11, 1946

⚙ *DIE CASTING, the economical short-cut between raw metal and finished parts, can now be carried out in any machine shop with a new machine costing no more than a small engine lathe. Completely fabricated die sets permit the manufacturer to make his own dies.*

Science News Letter, May 11, 1946

⚙ *CLEAN-KEEPER for typewriter-types is a special rubber pad on a handle that is used dry to brush over the type each day. The springy pad is behind a sheet of so-called blotting rubber which is well covered with tiny projections that remove the debris. No fluids are used with it.*

Science News Letter, May 11, 1946

⚙ *TELEVISION receiver for the home, made to sell for around $150, is shown in the picture. Housed in a cabinet 21 inches long, it employs a seven inch picture tube and provides a picture large enough for easy viewing by a group of people in an ordinary size room.*

Science News Letter, May 11, 1946

⚙ *FLOOR CLEANER and waxer is a perforated aluminum tray, about the size of a carpet sweeper, attached to an ordinary mop handle. A steel wool pad is clamped over it for cleaning; this is replaced with a waxing cloth when desired, liquid wax being poured into the tray.*

Science News Letter, May 11, 1946

⚙ *GIANT testing machine, which compresses, stretches and twists steel and other structural materials with tremendous power, can subject a steel beam or joint to 1,000,000 repetitions of stress in four days, or more than it would normally be subjected to in 50 years as part of a bridge.*

Science News Letter, May 11, 1946

⚙ *DIAL INDICATOR gauge for extremely small holes, the first of the type for drillings of such minute diameter, measures holes as small as .122 inch in diameter and up to about twice that size. With it, internal defects are recorded immediately on the dial and dimensional variations shown.*

Science News Letter, May 11, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 310.*

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Question Box

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